

Working satellites with a homebrew setup: Cuban style

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Since I heard about SuitSat-1 from the National Television of my country, I was encouraged to research about it, about amateur radio on International Space Station and space communications in general.



The only radio available for satellites was a broken 2m Yaesu FT-23R Handy Talkie which my grandfather bought for me. I fixed it, following the instructions from another ham of my Radio Club.



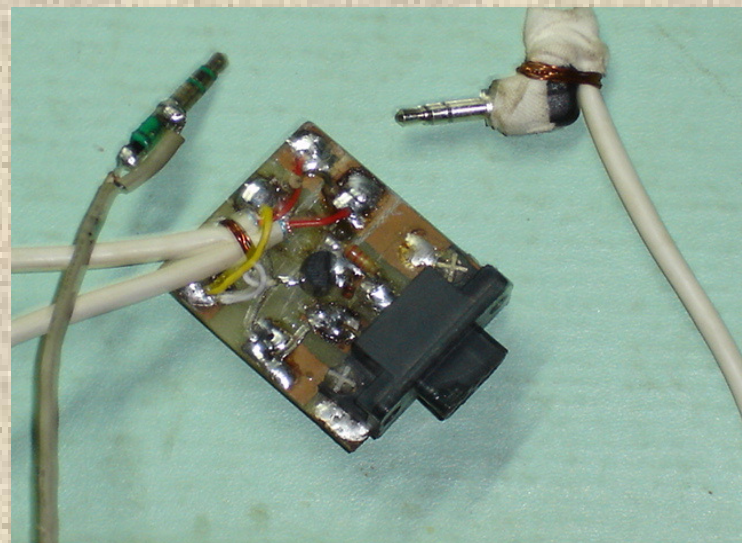
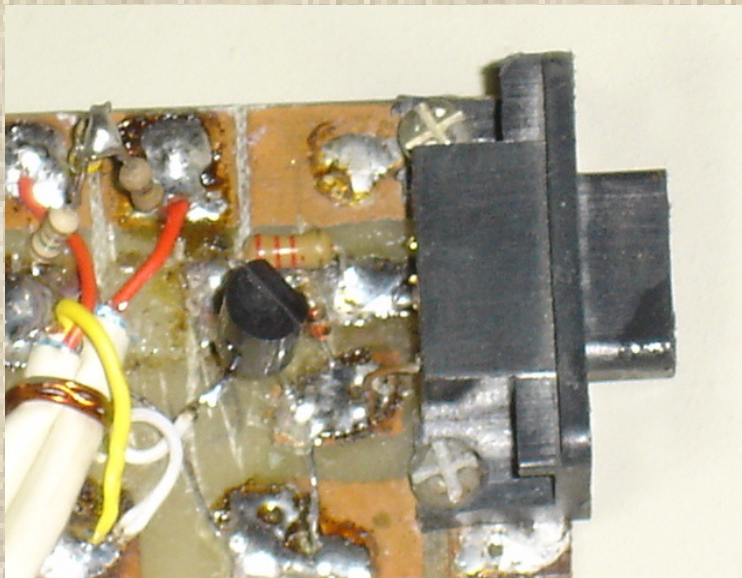
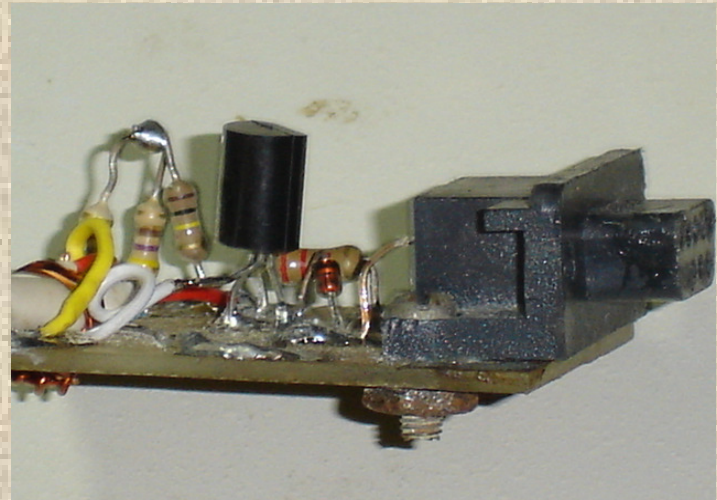
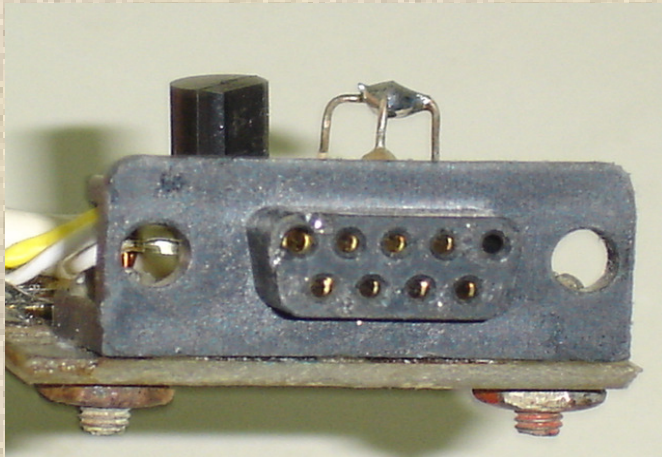
As I had been studying about antennas for satellites, I bent the Yagi's boom skyward and moved the small tower in front of my shack's window, ready to point it by hand through the window.

At the same time, I was trying to build my first PC computer with recycled parts.



It was ready for SuitSat-1, running an unregistered version of WXtrack on Windows 98.

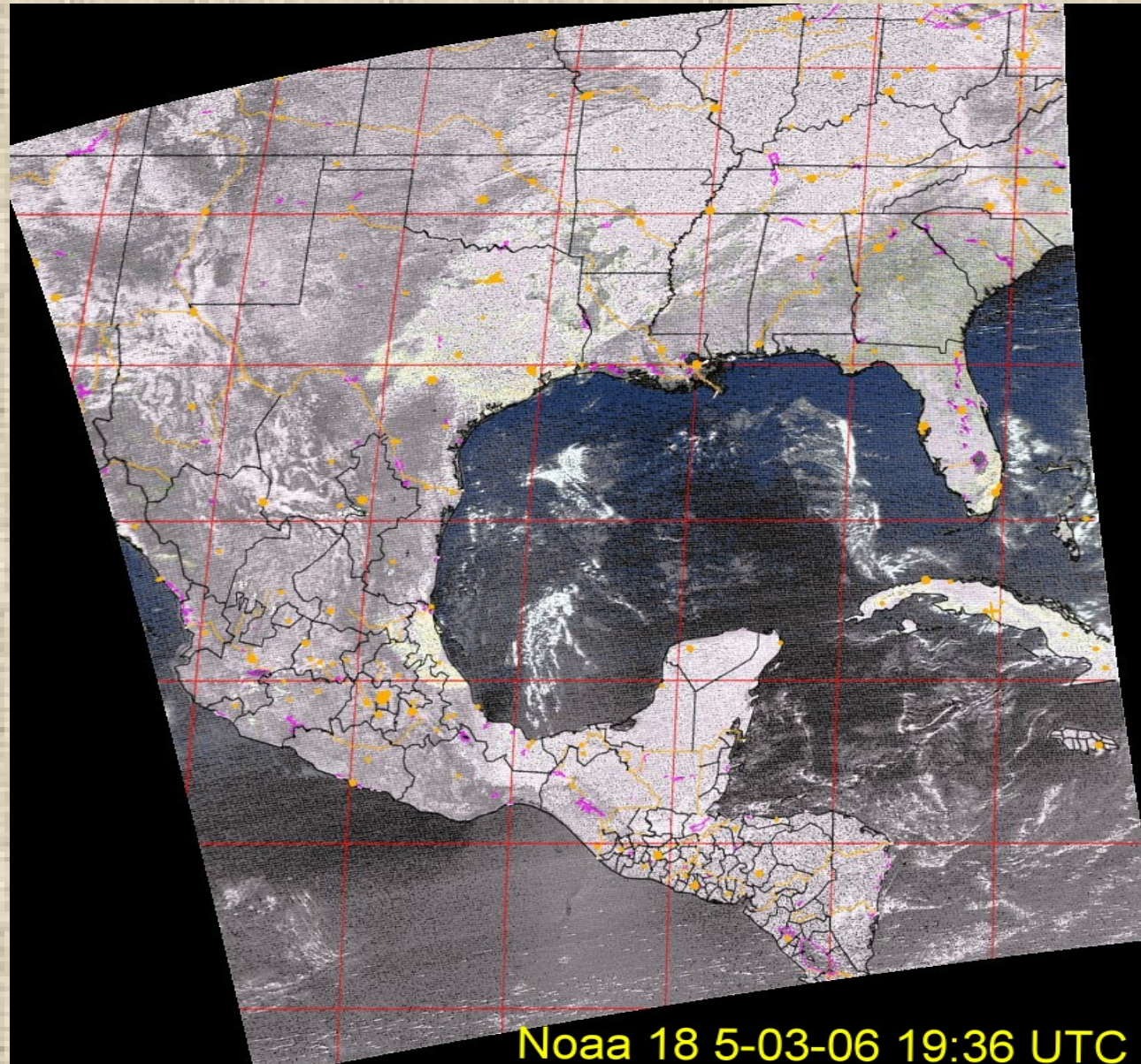
I built the interface to connect the FT-23R to the computer and made everything to work the ISS digipeater.



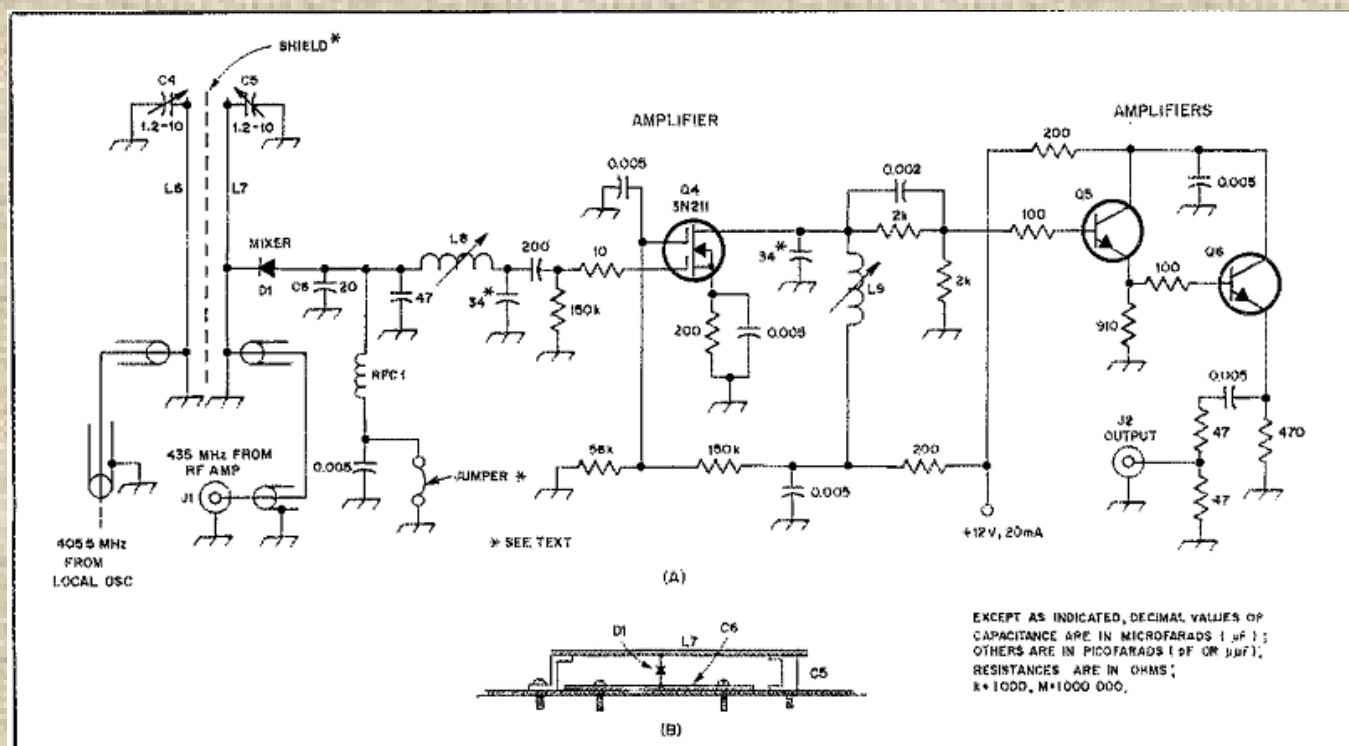
After some weeks, I had the first contact
with the International Space Station's crew.
An unforgettable moment in my life!



I also tried to receive the meteorological pictures from the NOAA weather satellites



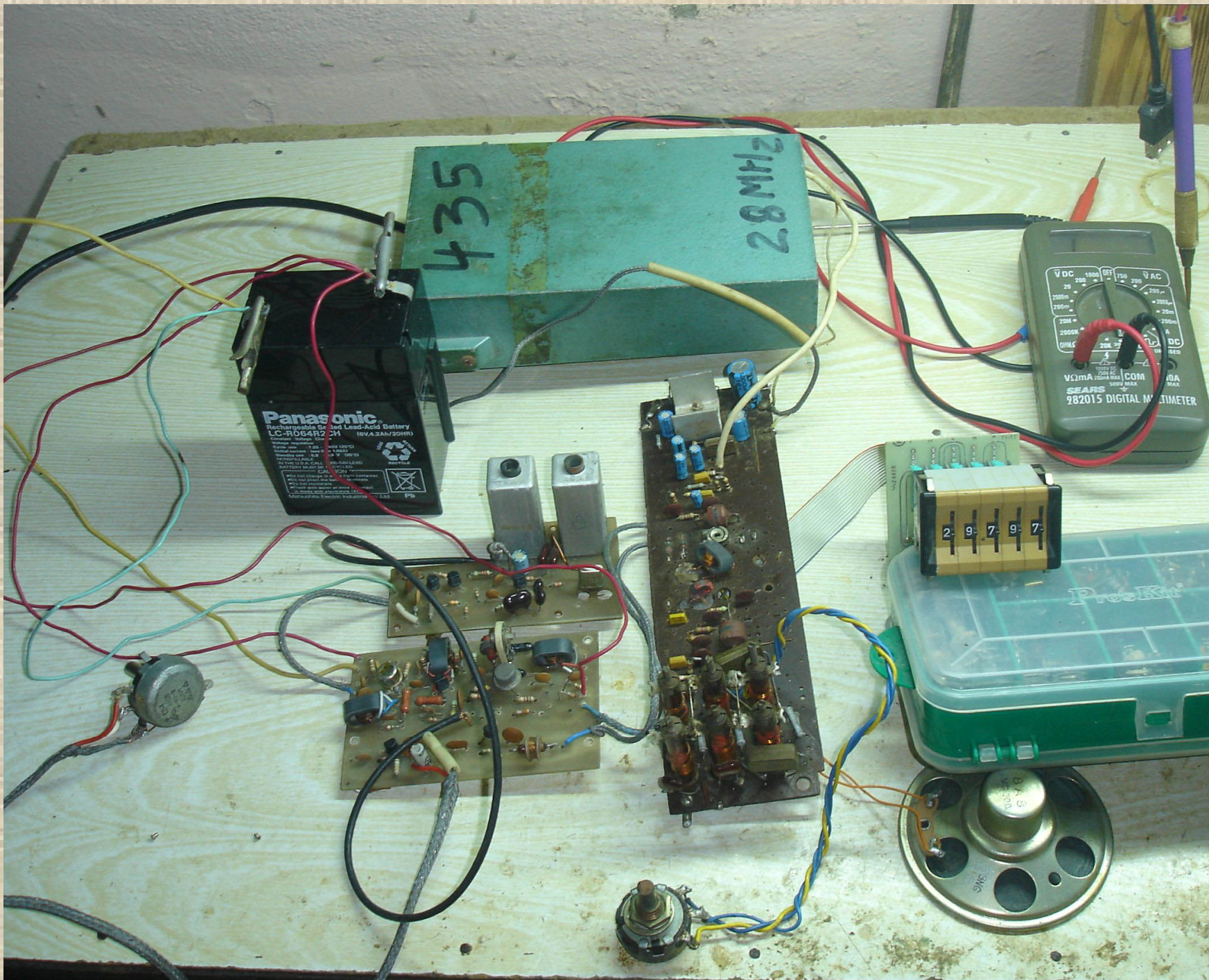
I found some 70cm downconverter designs online, and asked for help in some email lists about any other designs in order to choose the most complete and achievable project. This one came from Bill NZ5N who sent me a project published in the March 1983 QST by John W6IOJ.



I did not have a printed circuit board to make the circuits.



I built it in three TV tuner boxes without circuit board. I used a box for each module: local oscillator, mixer and RF-amplifier. This method made the project very easy to assemble



Azimuth rotor



Rotor control box

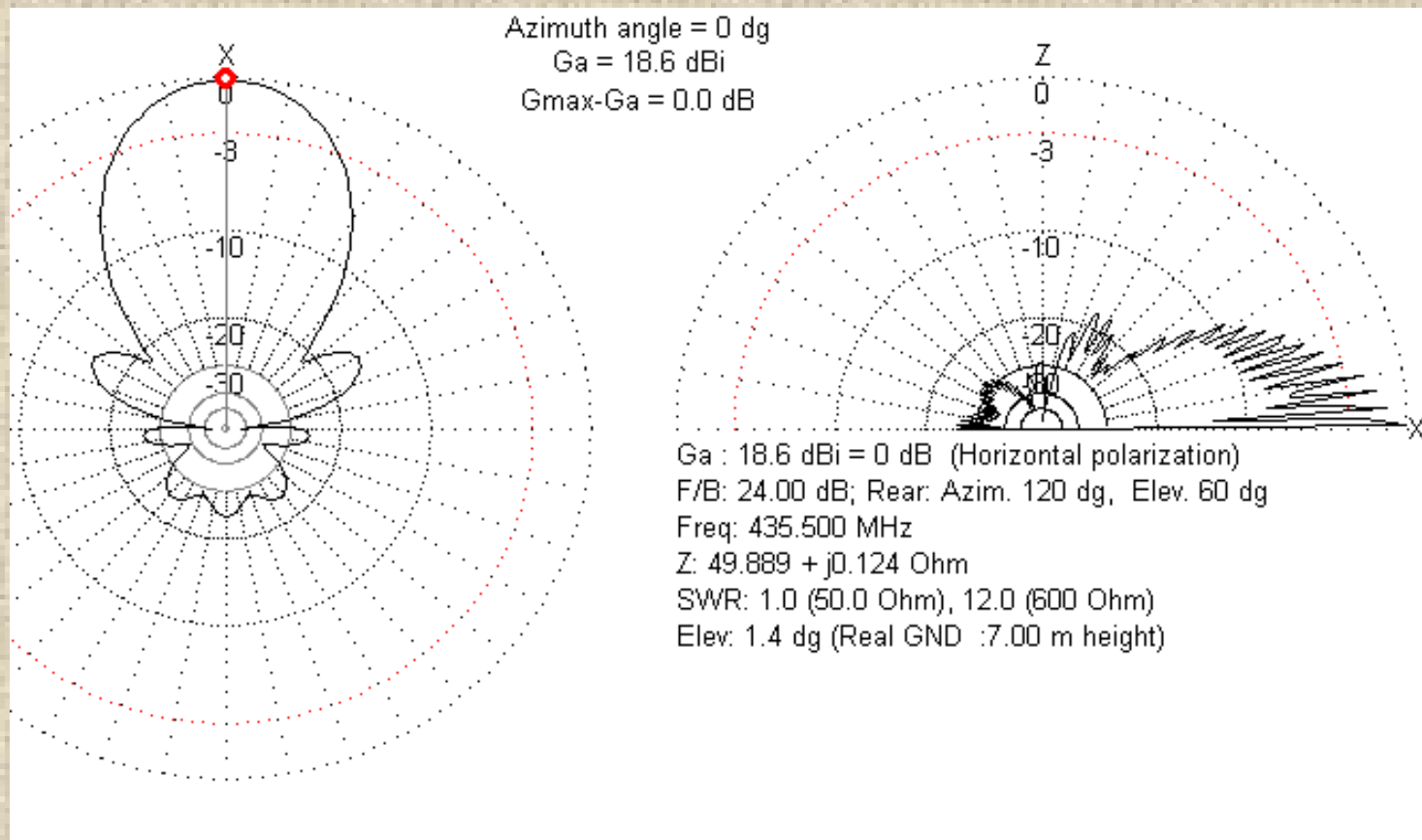


Rotor control box



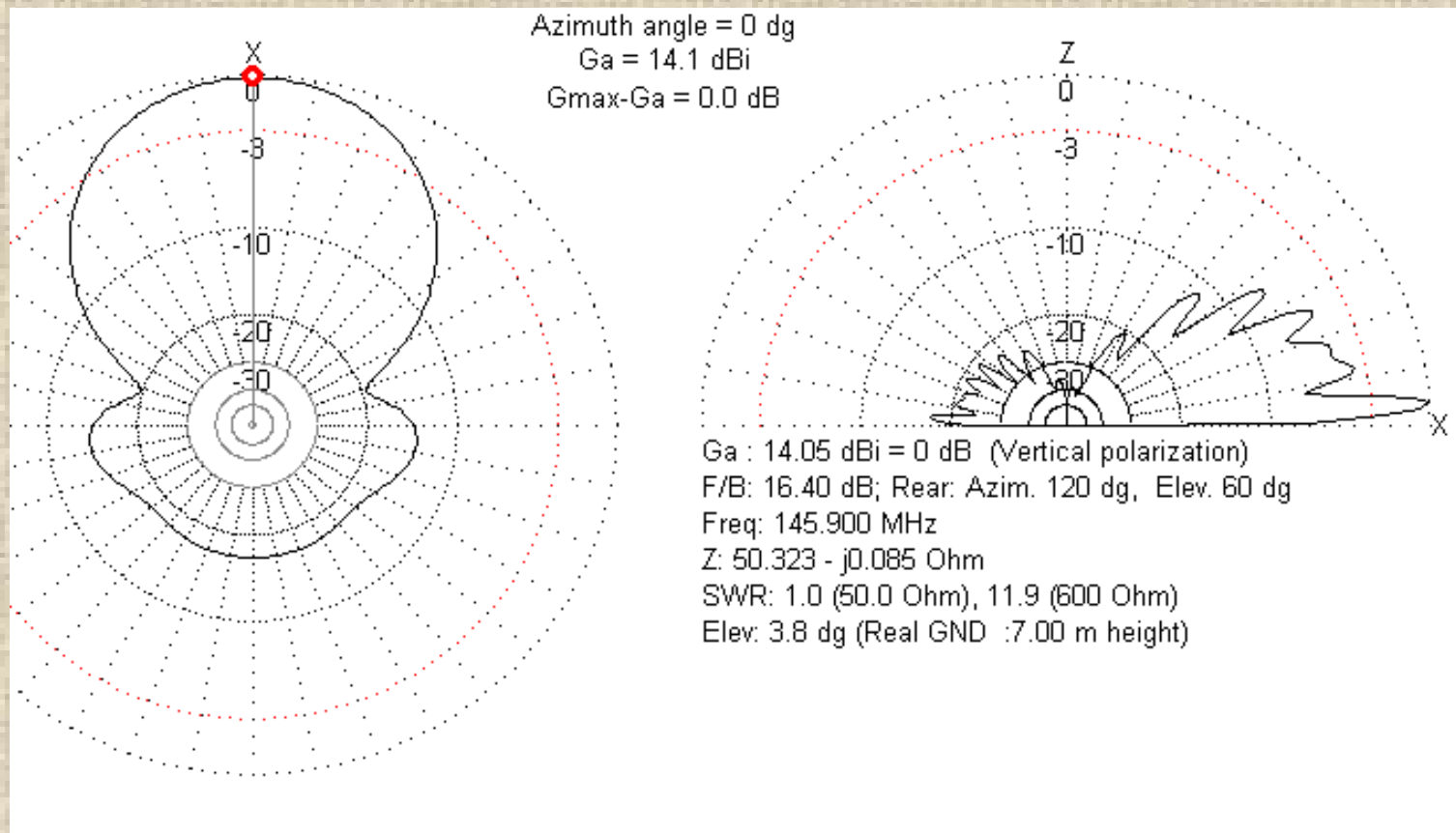
I designed two circularly-polarized Yagis, 18 elements for UHF and 10 elements for VHF. I simulated and optimized these in software called MMANA.

435 MHz



The calculations were done for the parts that I had in my "junk box". I used 30mm PVC pipe for the booms, and for the elements 4mm aluminum wire. The transmission lines were RG-58 coaxial cable.

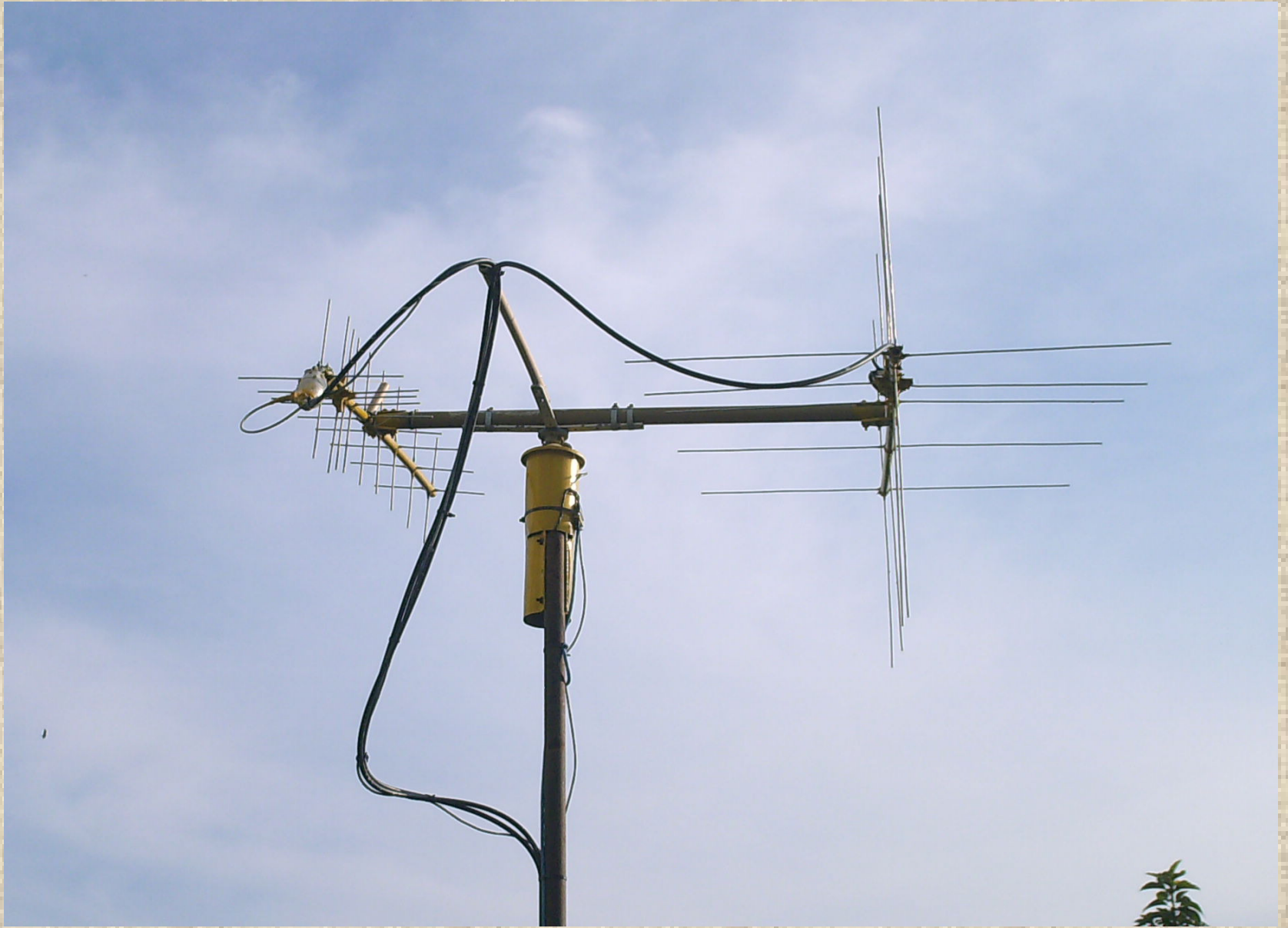
145 MHz



Antennas



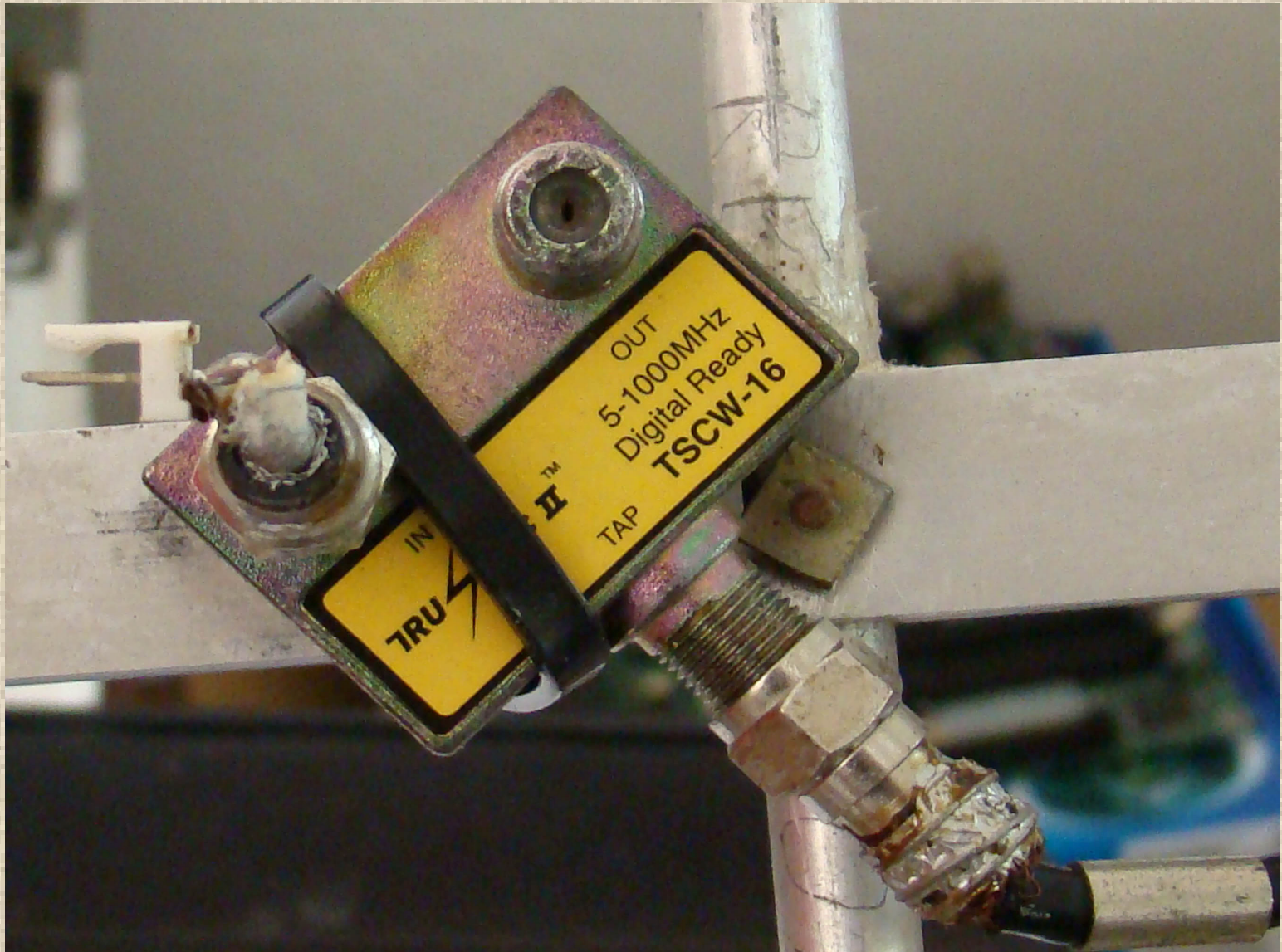
Antennas



Homebrew mast-mounted DF9CY preamplifier



Homebrew mast-mounted DF9CY preamplifier



Homebrew transverter & TRx



Majority homebrew portable setup



We have done several satellite presentations from radio clubs, universities, high schools, and parks. We have won a lot of satellite enthusiasts.

Majority homebrew portable setup



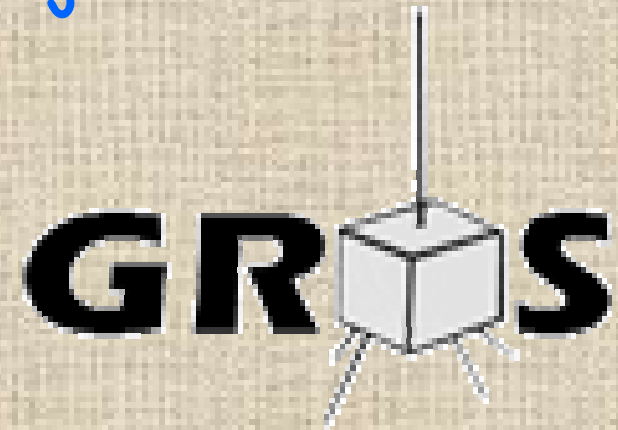
Satellite presentation from sea walk



Satellite presentation from Aguada town



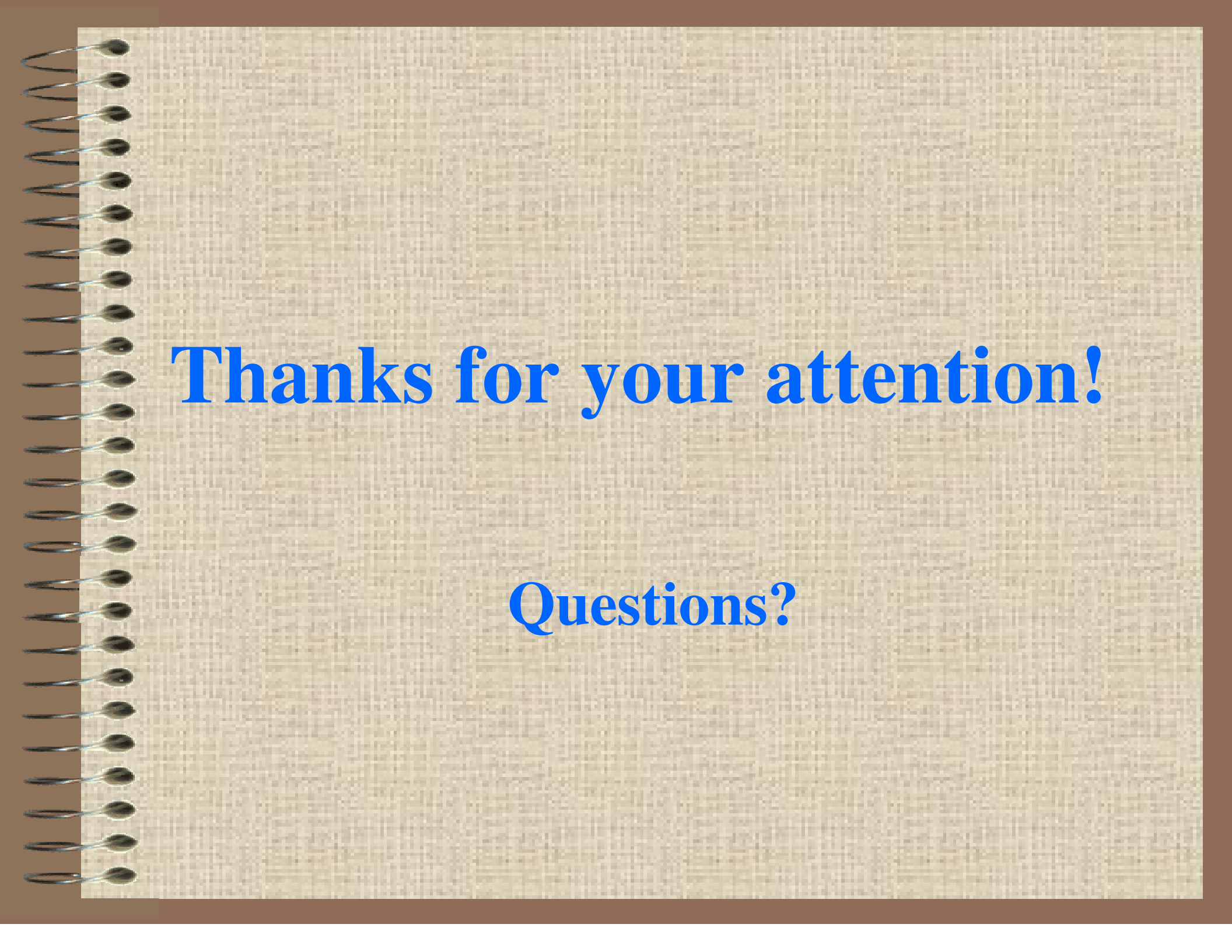
In Cuba, we are only a few satellite operators. The amateur satellites are a strange world for the majority of Cuban hams. In order to promote Amateur Radio by Satellite, we formed the first Cuban Satellite Group, named: Grupo de Radioaficionados para Operaciones Satelitales (GROS). We are trying to encourage operators to join us on this fascinating ride.



I want to say "thanks" to all of you my friends who have helped my satellite career.

I am very fortunate to have known each of you. I truly appreciate your assistance, advice, help and friendship in general! Thanks so much my friends!



The background of the slide is a spiral-bound notebook with a light beige, textured cover. The spiral binding is visible on the left side. The text is centered on the page.

Thanks for your attention!

Questions?